UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,947	06/14/2005	Geoffrey Spence	05-495	9470

20306 7590 09/04/2008

MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP
300 S. WACKER DRIVE
32ND FLOOR
CHICAGO, IL 60606

EXAMINER	
CHERY, DADY	

ART UNIT	PAPER NUMBER
2616	

MAIL DATE	DELIVERY MODE
09/04/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,947	SPENCE ET AL.	
	Examiner	Art Unit	
	DADY CHERY	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim1 -3 and 10 -17 are rejected under 35 U.S.C. 102(e) as being anticipated by Stetson (US Patent 6,701,170).

Regarding claims 1, 14 and 16, Stetson discloses a method and computer apparatus for separating a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, each source signal having a respective period similar or equal to p, the method comprising the steps **(Fig. 1 and Fig. 3)** of:

(a) expressing the composite signal as a matrix X having rows each of which is a respective segment of signal amplitude values and corresponds to a length of time associated with a signal cyclet **(Col. 5, lines 20 – 26);**

(b) implementing a decomposition of the matrix X by decorrelation and normalisation to obtain decomposition results **(Col. 6, lines 64 – 67) .;**

(c) performing independent component analysis (ICA) of the decomposition results to obtain at least one of estimated separated signal modulation envelopes and estimated separated signal cyclets **(Col. 7, lines 32 -67).**

Regarding claim 2, Stetson discloses a method according to claim 1 including the step of estimating source signal period p by synchronous averaging of the composite signal **(Col. 5, lines 30 -35).**

Regarding claim 3, Stetson discloses a method according to claim 1 wherein the decomposition is a singular value decomposition generating decomposition results comprising two singular vector matrices and a singular value matrix, and the step of performing ICA is carried out using one of the singular vector matrices to obtain at least one of an independent component matrix and an associated component matrix one of which matrices contains estimated separated signal modulation envelopes and the other contains estimated separated cyclets **(Col. 6, lines 64 – 67 and Col. 7, lines 32 - 67) .**

Regarding claim 5, Stetson discloses a method according to claim 3 wherein the signal modulation envelopes are more statistically independent than the cyclets and step (c) is performed on a singular vector matrix U to obtain an independent component matrix UR.sub.2.sup.T containing estimated separated signal envelopes and a matrix R.sub.2.lamda.V containing estimated separated cyclets **(Col. 7, lines 32 -67).**

Regarding claim 6, Stetson discloses a method according to claim 3 wherein the cyclets are more statistically independent than the signal envelopes and step (c) is

performed on a singular vector matrix V to obtain an independent component matrix R.sub.1.sup.TV containing estimated separated cyclets and a matrix U.lamda.R.sub.1 containing estimated separated signal envelopes **(Col. 7, lines 32 -67).**.

Regarding claim 10, Stetson discloses a method according to claim 1 wherein the composite signal is detected by a single sensor **(Fig. 1, 110).**

Regarding claim 11, Stetson discloses a method according to claim 1 including detecting the source signals are detected by using a plurality of sensors each of which provides a respective composite signal from which a respective matrix X is obtained and analysed in steps (a) to (c) **(Col. 1, lines 64 -67**, **Col. 5, lines 20 – 26 and Col. 6, lines 64 – 67)**.

Regarding claim 12, Stetson discloses a method according to claim 1 including detecting the source signals are detected by using a plurality of sensors providing respective composite signals, and the matrix X is obtained from the composite signals collectively **(Col. 1, lines 64 -67**, **Col. 5, lines 20 – 26 and Col. 6, lines 64 – 67)**.

Regarding claim 13, Stetson discloses a method according to claim 1 for apparatus condition monitoring, the source signals being obtained with the aid of at least one sensor from a plurality of apparatus sources, and the at least one of estimated separated signal modulation envelopes and estimated separated signal cyclets being analyzed for indications as to the condition of respective apparatus sources **(Fig. 1, Col. 4, lines 33 -60).**

Regarding claims 15 and 17, Stetson discloses a computer apparatus (**Fig. 1)** arranged to separate for separating a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, the source signals having periodicities similar or equal to p**(Fig. 3),** characterised in that and the computer apparatus being programmed **(Col. 6, lines 45 – 50)** to:

(a) partition the composite signal into a plurality of partition matrices X having rows each of which is a respective segment of signal amplitude values and corresponds to a length of time associated with a signal cyclet **(Col. 5, lines 20 – 26);**

(b) perform a singular value decomposition (SVD) of at least one of the matrices X to obtain two singular vector matrices U, V and a singular value matrix .lamda **(Col. 6, lines 64 – 67) .;**

(c) estimate a true period p of the source signals from an average of data within rows of the partition matrices X **(Col. 5, lines 30 -35);** and

(d) perform an independent component analysis of one of the singular vector matrices U, V generated by SVD from the matrix X partitioned in accordance with the estimated period p and so to obtain an independent component matrix UR.sub.2.sup.T, R.sub.1.sup.TV and an associated component matrix R.sub.2.lamda.V, U.lamda.R.sub.1, one component matrix UR.sub.2.sup.T, U.lamda.R.sub.1 containing estimated separated signal modulation envelopes and the other R.sub.2.lamda.V, R.sub.1.sup.TV contains containing estimated separated cyclets **(Col. 7, lines 32 -67).**

Allowable Subject Matter

1. Claims 4 and 7 -9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

2. Wells (US Patent 6,936,012)

3. Clarke (US Patent 6,262,943).

4. Lee et al. (US Patent 6,799,170).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DADY CHERY whose telephone number is (571)270-1207. The examiner can normally be reached on Monday - Thursday 8 am - 4 pm ESt.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Q. Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ricky Ngo/
Supervisory Patent Examiner, Art Unit 2616

/Dady Chery/
Examiner, Art Unit 2616
5.